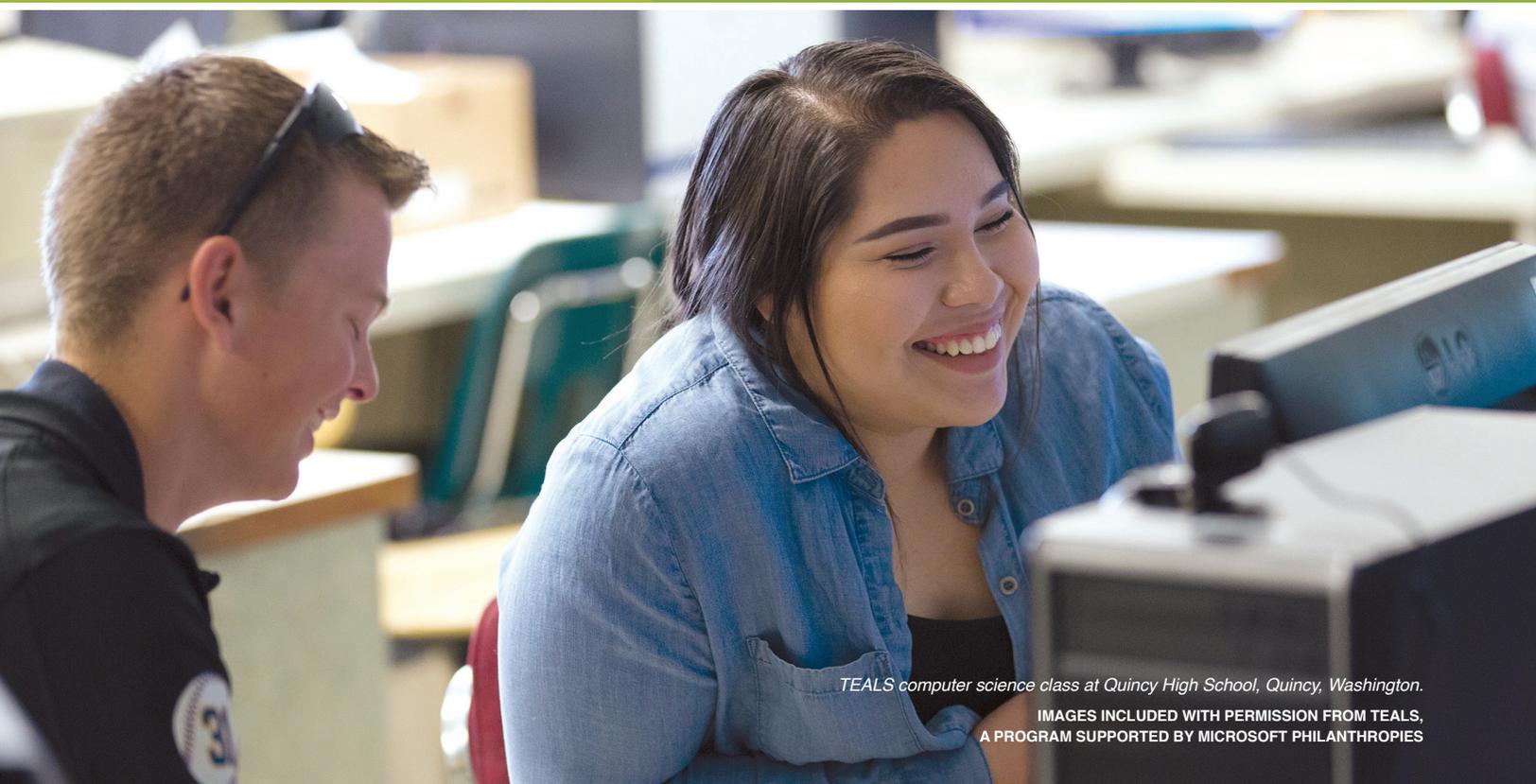


**WASHINGTON STATE  
STEM EDUCATION  
INNOVATION ALLIANCE**

# 2017 STEM Education Report Card



*TEALS computer science class at Quincy High School, Quincy, Washington.*

IMAGES INCLUDED WITH PERMISSION FROM TEALS,  
A PROGRAM SUPPORTED BY MICROSOFT PHILANTHROPIES

*Additional information on STEM educational achievement  
and workforce needs in the state can be found in Washington's  
STEM Talent Supply and Demand Dashboard ([stem.wa.gov](http://stem.wa.gov)).*



## THE STEM IMPERATIVE

Washington has one of the most dynamic economies in the nation, propelled by explosive growth in our STEM -driven technology sector. Allowing the vital, innovative companies in this sector to grow and thrive will require continued investment in the state's Science, Technology, Engineering, and Math (STEM) education system to meet expanding and evolving workforce needs. At all levels, we need to foster creativity and collaboration among students as they develop flexible problem solving skills and technical proficiencies. **While moderate progress has been made in some areas in recent years, overall improvement in the STEM pipeline remains a statewide imperative.**

The **STEM Education Innovation Alliance**, created in 2013, represents a broad range of business, education, government, labor, and nonprofit organizations, with the role of advising the Governor and Legislature on strategic planning and the formation of effective partnerships in support of STEM education initiatives.

### Overarching Goals:

- Inspire youth through **career connected and real-world STEM** learning opportunities.
- Provide every K-12 student **access to computer science** education.
- Prepare Washington's future workforce by increasing attainment of technical credentials, 2 and 4-year degrees and contributing to **Washington's 70% attainment goal**.
- Improve equity by implementing interventions to **close educational opportunity gaps from cradle to career**, providing world-class preparation and support for STEM teachers and improving workforce diversity.
- Raise public awareness and **support for STEM**.

Student in the mathematics lab at Pacific Lutheran University.

IMAGE COURTESY OF PACIFIC LUTHERAN UNIVERSITY/JOHN FROSCHAUER

## THE CHALLENGE



Our technology and innovation sector employers have a critical need for STEM-educated workers. Washington state ranks:

- **#1 nationally** in the concentration of STEM related jobs.
- **#3 in STEM job growth.**
- **#1 for Tech Innovation Capacity.**



But STEM training and degree production in Washington is not keeping pace with demand.

- **Washington ranks low** in the production of computer science, engineering and health degrees relative to job openings in those fields.
- **Ranks 47th in the nation** and **last** among the top fifteen high-tech-intensive states in the proportion of high school graduates who go directly to college.

Thus employers are forced to import STEM-educated workers trained in other states.

- Washington is the **2nd largest importer** of degrees among tech states, and
- **1st among all 50 states** as a proportion of population.

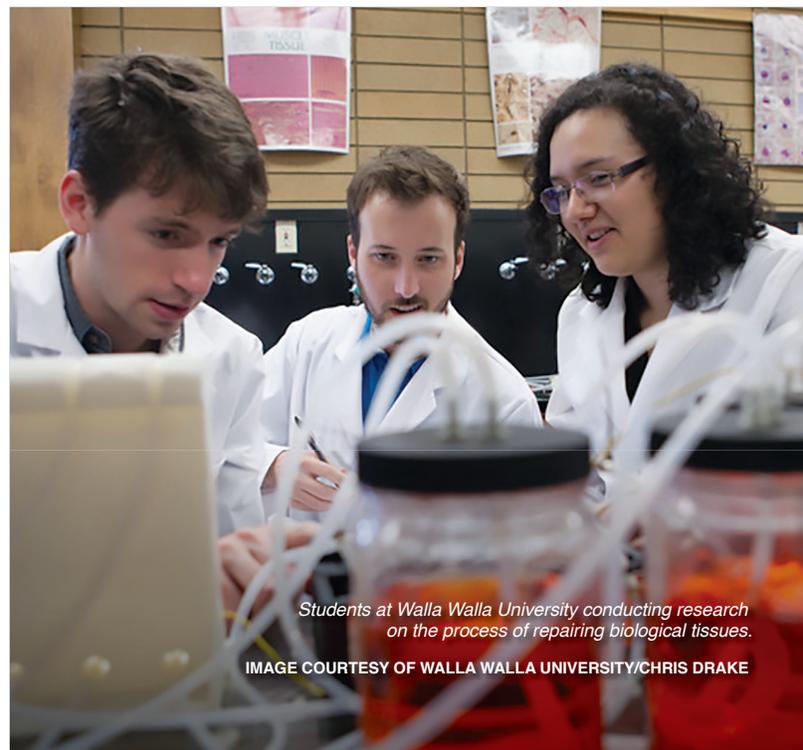


TEALS computer science class at Woodinville High School, Woodinville, Washington.

IMAGES INCLUDED WITH PERMISSION FROM TEALS, A PROGRAM SUPPORTED BY MICROSOFT PHILANTHROPIES



Chemistry student at Olympic College.  
IMAGE COURTESY OF OLYMPIC COLLEGE



Students at Walla Walla University conducting research on the process of repairing biological tissues.

IMAGE COURTESY OF WALLA WALLA UNIVERSITY/CHRIS DRAKE

# KEY STEM PROGRESS INDICATORS

## STEM awareness.

In 2015, approximately **50%** of Washington voters had heard of STEM, an increase from **32%** in 2013.

## Interest in STEM studies among high school students.

In 2016, approximately **31%** of Washington SAT-takers indicated an intention to pursue a degree in a STEM major, an increase from **25%** in 2010.

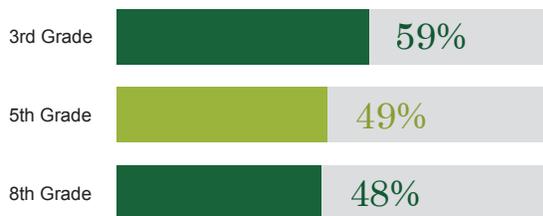
## STEM achievement: Pre-school through K-12.

### Kindergarten readiness in math

About **61%** of incoming kindergarteners demonstrated “kindergarten readiness” in math among students assessed by WaKIDS, 2015-16.

### Smarter Balanced Assessment math scores, 2015-2016:

- At the 3rd grade level, more than one-half (**59%**) of students met the math standard.
- At the 5th grade level, **49%** met the standard.
- At the 8th grade level, **48%** met the standard.



## Student readiness for College-Level studies in STEM subjects:

### Advanced Placement (AP) Computer Science:

- The number of high schools offering AP Computer Science in Washington has grown substantially from 14 schools in 2011 to 93 schools in 2017.
- Simultaneously, the number of students taking the AP Computer Science exam has grown from 439 in 2011 to 1,945 students in 2016. Among those **66%** earned a score consistent with college credit in 2016.

Yet, despite this progress less than **10%** of high schools currently offer AP computer science. Alignment of STEM education programs with workforce demand in key economic sectors.

We have made progress in raising the number of Washington higher education graduates earning degrees in STEM fields, but the percentage is still too low to meet workforce needs. More than one-fourth (**29%**) of undergraduate degrees awarded at Washington public baccalaureate institutions in 2015 were in STEM subjects, up from **21%** in 2010.

## STEM degree completions have shown steady increases in recent years (2011–2015).

### At the Associate Level:

- Degree completions in STEM fields increased by **20%**.

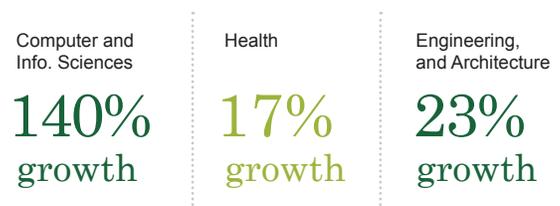
### At the Baccalaureate Level:

- Degree completions in Computer and Information Sciences grew by **72%**, in Engineering and Related Fields by **30%**, and in Health by **27%**.



### At the Graduate Level:

- Degree completions in Computer and Information Sciences grew by **140%**, in Health by **17%** and in Engineering and Architecture by **23%**.



However, many STEM programs remain highly selective and limited enrollment capacity remains a barrier in some fields, particularly in computer science.

**And rapidly growing workforce demand is still outpacing STEM degree production.**

- There is a widening gap between projected annual job openings for computer scientists and the number of graduates in Washington prepared to fill them.
- Projections for the years 2018–2023 estimate that:
  - Out of a total of about 6,500 annual job openings, there will be **3,800 more openings** in Computer Science than there are graduates completing degree programs and prepared to take them.

Graduate filled jobs



Unfilled jobs

- Out of a total of about 2,750 annual job openings, there will be **660 more openings** in Engineering than there are graduates completing degree programs.

Graduates



Unfilled jobs

**Underrepresented populations in STEM.**

**A gender imbalance in STEM achievement tends to widen as students move through the pipeline.**

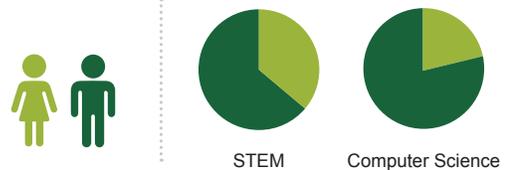
- Among pre-K students, girls tend to do as well as boys in math, with about **60%** demonstrating “kindergarten readiness” in the 2015-2016 WaKIDS assessment.



- As they move through the education pipeline, however, interest and achievement in STEM tends to fade for female students. In 2015, only **22%** of students completing AP Computer Science were female.



- Male students also complete STEM degrees in greater numbers than female students. In 2015, only **34%** of students completing associate degrees or bachelor’s degrees in STEM were female and only **22%** completed degrees in computer science.



**Students from low income families are disadvantaged at all stages in the STEM pipeline.**

- Among low-income pre-K students, only **49%** demonstrated “kindergarten readiness” in math in 2015-16.



- In 2014, among students completing AP Computer Science courses only **14%** were from low-income families.



# POLICY RECOMMENDATIONS

The STEM Education Innovation Alliance is committed to devising innovative policies that will enhance STEM education and career pathways, advance economic development, meet our state's urgent workforce demands, incentivize regional public and private partnerships, and provide opportunities for more Washingtonians to compete for jobs in this vital high-wage sector.

## Increase support for underrepresented populations in STEM fields.

- Expand opportunities to study math, science, and technology, such as those offered by Technology Access Foundation (TAF) courses.
- Invest in MESA to make it available at every Community College.
- Expand support for the Washington State Opportunity Scholarship.
- Provide greater access to advanced coursework, including dual credit programs, necessary for success in STEM majors.

## Ensure our education system is STEM ready by providing resources to schools and teachers to provide a rich STEM experience for students, including quality computer science instruction.

### Early Learning and Elementary

- Provide toolkits that link preschool and K-12 mathematics, support intensive teacher learning, and identify effective parent/family engagement resources.
- Enhance teacher learning supports to encourage implementation of engineering practices and design challenges related to local industries.
- Create incentives to expand opportunities for students to develop computational thinking skills.

### Middle and High School

- Make rigorous computer science instruction, such as AP Computer Science, available to students in every high school.
- Expand professional learning opportunities in computer science, including innovative programs like TEALS, Code.org, TechStart, and the Pacific Education Institute.

- Increase opportunities for middle school students to enroll in STEM courses and earn high school credit.
- Broaden professional learning opportunities in STEM for educators and school leaders.
- Increase availability of computer science and other STEM-related endorsements for pre-service and in-service teachers.

### Postsecondary

- Fund additional enrollments in high quality programs in Computer Science and other high employer demand STEM disciplines.
- Maintain stable and predictable tuition and support state aid programs that address access and completion challenges for low-income students.
- Provide equitable opportunities for low-income students and improve completion rates by fully funding the State Need Grant program to support all eligible students.

## Expand opportunities for career-connected learning.

- Provide stipends or student aid for pre-apprenticeship students entering innovative programs like Apprenti, the registered apprenticeship program developed by Washington Technology Industry Association.
- Expand apprenticeship opportunities into other high demand technology fields.
- Provide industry standard equipment and connectivity in all classrooms that use computer technology.
- Enhance career guidance and support through High School and Beyond planning, advisory courses, and work integrated learning opportunities.
- Increase funding for State Work Study and encourage colleges to create new mentor partnerships with K-12 schools.